

ملخص عملي الاساتنة لفرقة الخامسة

Concepts of linical examination

Reviewed & Accepted by:

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VISIT...

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General Examination

- Stand on the right side of the patient.
- I. Facial expression.
- II. Body Built.
- III. Decubitus (Position in bed)
- IV. Vital signs: Pulse, Blood pressure, Temperature & Respiratory rate.
- V. Head and Neck examination:
 - 1. Colours: Jaundice - pallor - cyanosis.
 - 2. Tubes: Carotids. - Neck veins. - Trachea.
 - 3. Glands: Thyroid. - parotid. - Lymph nodes.
- VI. Extremities: Upper limb. - lower limb
- VII. Do Not Forget Breast exam. - Axilla exam. - Back

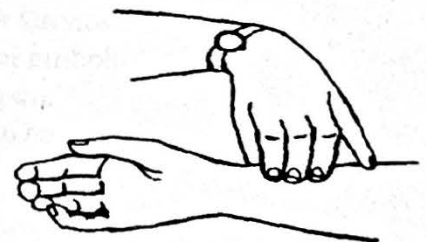
- Facial expression: Examples of Abnormal Facial expression:
 - Puffy eyes: Nephrotic, nephritic, hypothyroidism.
 - Hepatic facies: wasting of temporalis muscles with prominent zygoma.
 - Mongoloid (thalassemic) facies: pallor, prominent maxilla and zygoma

- Body built: Causes of generalized wasting (cachexia):
 - 1 - Malignancy. 2 - Malabsorption. 3 - HIV.
 - 4 - Uncontrolled Diabetes. 5 - Uncontrolled thyrotoxicosis.

6 - TB

7 - Cardiac Cachexia (A.P.)

- Decubitus: Examples of Abnormal decubitus:
 - Semi-sitting (Orthopnic posture) as in heart failure.
 - Leaning forward (Prayer's position): pericarditis.



Vital signs

Pulse:

Normal pulse is composed of an upstroke then downstroke with a dicrotic notch.

Method: palpate the radial pulse with the tips of your middle three fingers and comment on:

- 1- Rate: normal rate is 60 - 90 / minute.
- 2- Rhythm: Regular or irregular.
- 3- Volume: (difference between systolic & diastolic pressure) it is either average, small, or large volume).
- 4- Equality on both sides: palpate both radial pulses simultaneously.
- 5- Special character best examined on carotid artery.
- 6- Palpation of other peripheral pulsations.
- 7- Examine for radio femoral delay: +ve in coarctation of aorta.
- 8- Arterial Wall: normally not felt

Abnormalities of the Pulse

I- Rate.

- Bradycardia < 60 / minute. Hypothyroidism, Hypothermia, Athletes.
- Tachycardia > 90 / minute: Hyperthyroidism, Fever, Exercise, Anemia.

2-Rhythm:

- **Regular pulse:** normal
- **Irregular pulse:** Causes: Atrial fibrillation (AF) & Multiple extrasystole.

<u>AF</u>	<u>Multiple extrasystole</u>
Marked irregularity.	Occasional irregularity.
Can not count 4 regular beats.	can count 4 regular beats.
Pulse deficit > 10	Pulse deficit < 10
Exercise increases irregularity	Irregularity disappears.

- **Pulse deficit:** Apical pulse is more than radial pulse in AF.

3- Volume = pulse pressure = SBP-DBP ≈ 40 mm Hg

1. **Small pulse volume** (weak pulse, pulse pressure ≤ 20) : shock, heart failure.
2. **Big pulse volume** (strong pulse, pulse pressure ≥ 60) : Hyperdynamic circulation.

Causes of hyperdynamic circulation:

- Anemia & Fever & Pregnancy & thyrotoxicosis
- Aortic regurge.
- Liver cell failure (increased vasodilators).

4-Equality on both sides:

Causes of Unequal pulse:

1. **Compression** on subclavian artery from outside by Pancoast tumor or Cervical rib.
2. **Occlusion** of subclavian or axillary arteries from inside by Thrombus or embolus.
3. **Vessel wall disease** as takayaso vasculitis and Dissecting aortic aneurysm.

NB: If you suspect unequal pulse volume between right and left upper limbs, you have to

6- Special characters of the pulse (by palpating the carotid):

✶ A 1. **Water hammer (collapsing)** : Rapid upstroke and Rapid descent as in hyperdynamic circulation.

✶ A 2. **Pulsus bigeminy and trigeminy (extrasystoles)**: Digitalis toxicity

- Regularly Irregular pulse.

B 3. **Pulsus alternans**:

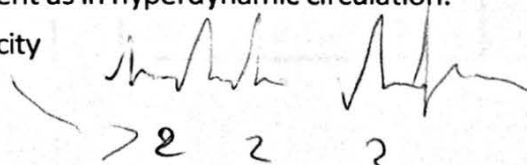
- Alternating strong and weak beats but still regular
- Causes: left sided heart failure.

C 4. **Pulsus paradoxus**:

- Pulse volume decreases or even the pulse disappears with holding breath in deep inspiration, detected better by Sphygmomanometer (systolic BP decreases ≥ 10 with deep inspiration).
- Causes:
 1. Massive pericardial effusion.
 2. Constrictive pericarditis.
 3. Severe chronic obstructive pulmonary disease (COPD) & sever bronchial Asthma

✶ 5. **Pulsus bisferiens**: the pulse has double beats: Occurs in pure AR & combined AS and severe AR.

✶ 6. **Pulsus parvus et tardus (plateau pulse)**: Small delayed pulse: in AS

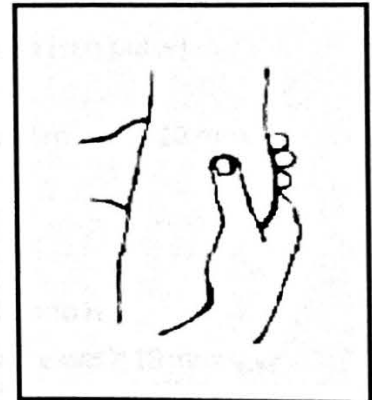
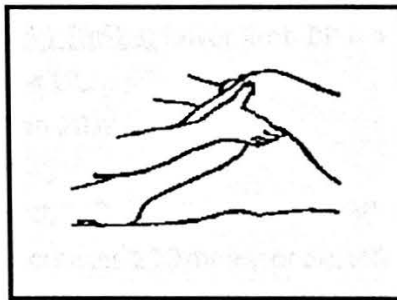
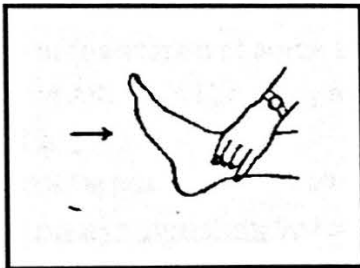


7- Peripheral pulsations :

- ✓ **Dorsalis pedis artery** : Felt lateral to extensor hallucis longus tendon against navicular bone . Absent in severe lower limb ischemia & in 5% of normal subjects.
- ✓ **Anterior tibial artery** : Midpoint between the two malleoli anteriorly , lateral to the tendon of extensor hallucis longus .
- ✓ **Posterior tibial artery** : Behind and below the medial malleolus.
- ✓ **Popliteal artery** : Felt in the middle of popliteal fossa while the patient lies supine with the knee slightly flexed , place both thumbs on the patella and place the fingers of both hands firmly into the popliteal fossa.
- ✓ **Femoral artery** : 4 cm below the mid inguinal point" midway between ASIS and symphysis pubis" against the neck of femur.
- ✓ **Radial artery** : Felt just lateral to the tendon of flexor carpi radialis against styloid process of radius.
- ✓ **Brachial artery** : Elbow is slightly flexed and supported by your left hand , examine by the right thumb , medial to the tendon of biceps muscle against lower end humerus. *same as 42-2-1 hum m l*

Causes of absent (or decreased) peripheral pulsations:

1. Compression **from outside** by tumor .
2. Occlusion **from inside** by Thrombus or embolus .
3. **Vessel wall** disease as vasculitis .
4. Severe hypotension



Temperature

❖ Normal core body temperature: 36.5 - 37.2 °C

- Measured orally for 2 minutes under the tongue
- If axillary or groin (children): add 1/2 °C (this method is better avoided)
- If per/rectum: subtract 1/2 °C.
- Hypothermia if temp. <35, hyperpyrexia if temp. >41c.

❖ Indication of Per rectal (PR) temperature measurement:

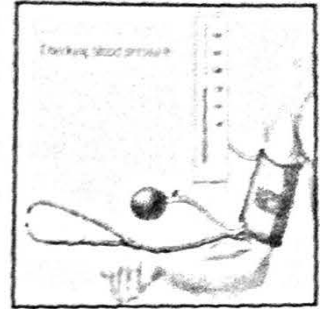
- Children, Psychotic, Coma & Convulsions.
- Open Tuberculosis, Mouth breathers.

NB: Every 1 °C elevation of temperature increases pulse by 10- 15 beats / min.

- Higher pulse rate for a given fever occurs in carditis.
- Slower pulse rate for a given fever in brucellosis, typhoid, meningitis, viral infection.

Blood pressure: (rules of BP measurements)

- ✓ The cuff contains an air bag called **the bladder**.
- ✓ Its width should be 40% and its length 80% of the arm circumference.
- ✓ The bladder and its rubber tubes located medially.
- ✗ **The cuff & sphygm.** at the same level of the heart with supported forearm.
- ✓ **The patient** is physically and mentally at rest for at least 5 min.
- ✓ The patient is sitting with supported back, resting his feet on the floor.



Methods of BP measurement:

1. **Palpatory method:** Raise pressure 20-30 mm Hg above the level at which pulse disappeared by palpation to hear the systolic blood pressure by auscultatory method.
 2. **Auscultatory method** (krotokoff sounds):
 - **Sound appears** → The Systolic BP.
 - **Sound Disappears** → the diastolic BP.
 - In AR, sound will not disappear due to the presence of pistol shot So, the diastolic BP will be zero but the actual diastolic BP will be where the sound is **muffled**.
 - In AF take the average of several readings.
 - ✗ **Difference between both upper limbs:** Normally < 10 mmHg.
 - Difference > 10 mmHg: **same causes as unequal pulse volume** (see pulse).
 - ✗ **Difference between upper and lower limbs:** lower limb BP is > upper limb by < 20 mmHg.
 - In coarctation of aorta: BP in LL < UL.
 - In AR: BP in LL > UL by more than 20 mmHg.
 - ✗ **Effect of posture:**
 - In changing posture from supine to erect, SBP ↓ < 20 mm Hg & DBP ↑ < 10 mm Hg.
 - ✗ **Postural hypotension:** Systolic BP decreases ≥ 20 mmHg or diastolic BP decreases ≥ 10 mmHg or symptoms of cerebral hypoperfusion after standing for 2-5 min.
- Causes of Postural hypotension:**
1. Autonomic neuropathy as in diabetes.
 2. Hypovolemia (the earliest sign).
 3. Anti hypertensive medications.
 4. Hypocorticism (Addison's disease).
-
- ✗ **Indication of BP measurement in LL:** suspected coarctation, AR, bilateral A-V fistula

Hypertension: BP is persistently (at least twice, 2 weeks apart) ≥ 140/90.

3 times

Respiratory rate: Normal respiratory rate: 16-20 / minute

Head and Neck examination

Eyes :

- **Pallor:** in palpebral conjunctiva, lips, tongue, nail bed and palmar creases
- **Jaundice:** yellowish discoloration of the sclera if serum bilirubin ≥ 2.5 mg/dl.
 - Eye brows: Loss of the outer 1/3 in hypothyroidism & leprosy.
 - Puffiness: Nephrotic & Nephritic syndrome, hypothyroidism.
 - Exophthalmos: Thyrotoxicosis.

Mouth

- ❖ **Pallor:** inner side of the lip.
- ❖ **Central cyanosis:** seen in the undersurface of the tongue.
 - Ulcers: Behcet's disease, Dyspeptic ulcer, Aphthous ulcers
 - Tongue: Red glazed with atrophic papillae: vit B deficiency & Iron deficiency.

Spider naevi : in the distribution of SVC as in Liver cirrhosis, excess estrogen as in pregnancy .

✓ Causes of pallor: →

1- Anemia.	2- Peripheral VC as in shock
3- Low cardiac output as in HF	4- Generalized edema, myxedema.

✓ Causes of yellow skin:

- 1- **Jaundice:** if serum bilirubin > 2.5 mg%, (haemolytic, obstructive, hepatocellular Jaundice)
- 2- **Carotinemia:** skin (palms, soles, face) not mucous m. (Myxedema & Liver failure & ↑ Carrots.)
- 3- **Uraemia** (renal failure).

DD Between peripheral and central cyanosis:

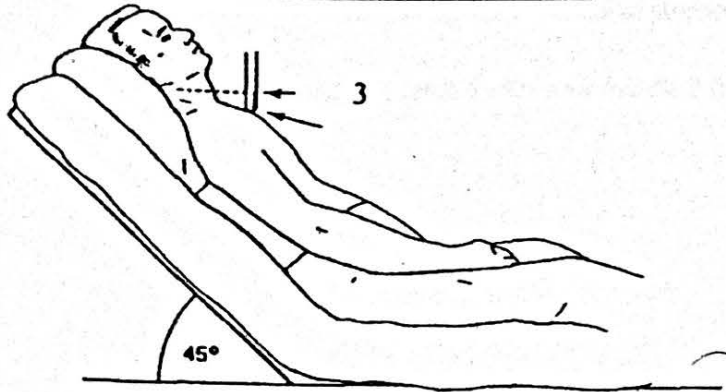
	Peripheral cyanosis (Stagnation hypoxia)	Central cyanosis (anoxic hypoxia)
Causes	- Cold exposure. - Peripheral vascular disease - Heart Failure & Shock. - Polycythemia.	Appear if reduced HB that is ejected from heart is about 5 gram% , its causes are: 1- Cardiac: Congenital Cyanotic heart disease. 2- Chest: respiratory Failure.
Site	Peripheral parts: Hands, feet, ear, nose, never the tongue .	Seen in the tongue and peripheral parts
Hands	Cold hands no clubbing	Warm hands Clubbing after about 2 months
Hand Warming	Cyanosis decreases.	Cyanosis increases (no improvement)
Effect of oxygen	No effect.	Cyanosis decreases.

When central cyanosis does not appear in tongue: in cases of differential cyanosis.

Why peripheral cyanosis dose not appear in tongue: as it is well perfused

- Double blood supply of the tongue
- The most mobile organ
- No vasoconstrictor sympathetic fibres.
- Kept warm inside mouth cavity.
- **When peripheral cyanosis appears in tongue:** in SVC obstruction.

Neck Veins Examination.



DD between venous and carotid pulsations:

Venous pulsations	Carotid pulsation
Wavy	Jerky
Seen better than felt	felt better than seen
Lateral to sternomastoid	Medial to sternomastoid
Hepatojugular reflux: Normally, Pressure on liver or abdomen for 30 seconds (if the liver is congested) → pulsations are more prominent.	
	No effect

1- **Congested or not:** At semisetting position (45°), pulsations are normally seen just 3 cm above the clavicles (3 cm vertical above the sternal angle).

Causes of congested pulsating NV:

- 1- RSHF / Pericardial effusion / constrictive pericarditis.
- 2- Increased intrathoracic pressure: COPD & Mediastinal syndrome.
- 3- Increased intra-abdominal pressure: Ascites, & pregnancy.
- 4- Increased blood volume: Hypervolemia.

Causes of congested non pulsating NV:

- Superior vena Cava obstruction (thrombosis or compression by tumour).
- Massive pericardial effusion (cardiac tamponade).

2- Relation to Pulse:

- **Normal Systolic Collapse.**
- **Systolic expansion:** its causes are
 - Tricuspid Regurge
 - Cannon a wave: Atrium contract at same time of ventricular contraction.

3- Relation to respiration:

- Inspiratory emptying: in chest & abdominal causes
- Inspiratory filling: in cardiac & pericardial causes (kaussmaul sign).

Common Carotid artery: (felt Against the transverse process of C6)

- Put your thumb on carotid artery at the level of cricoid cartilage medial to sternomastoid and ask patient to look to the same side.
- Other method: stand behind the patient and feel the carotid with your middle 3 finger



Trachea: (see chest)

Examination of lymph nodes.

1. Cervical lymphadenopathy:

I. Circular group:

- Inner ring :(Waldeyer's ring): Retropharyngeal, tonsils, lymphatic tissue around Eustachian tube.
- Outer ring: Submental, submandibular, pre-auricular, post-auricular and occipital lymph nodes.

II. Vertical group:

- Superficial Group: along the body of sternomastoid muscle.
- Deep Group:
 - Anterior Cervical LN: Infrahyoid, pre-laryngeal, pre-tracheal lymph node
 - Upper deep Cervical LN: deep to sternomastoid (behind angle of mandible) .
 - Lower deep Cervical LN: deep to sternomastoid (left lower deep cervical LN is called Virchow's lymph node).

2. Axillary nodes:

- Pectoral group: along the anterior axillary fold
- Subscapular group : along the posterior axillary fold.
- Apical : along the floor of the axilla.

3. Epitrochlear nodes: shake the hand of the patient and feel the nodes by the other hand.

4. Inguinal lymph nodes are usually non specific in persons who walk with bare feet.

5. Popliteal lymph nodes.

6. Spleen & paraaortic lymph nodes.

Thyroid Gland : Lies in front of the larynx and trachea, Normal thyroid is neither visible nor palpable.

- **Inspection:** Swelling in the front of the lower part of the neck that moves up and down with deglutition
- **Palpation:** stand behind the sitting patient. Feel the thyroid gland with one hand and push it to the other hand. Comment on consistency, surface, tenderness, pulsations (thyrotoxicosis), surrounding structures, (trachea, carotid, muscles, lymph nodes especially in malignant cases)
- **Percussion:** Dullness over manubrium stemi in retrosternal goiter.
- **Auscultation:** Bruit (systolic murmur) is present in thyrotoxicosis.

Pemberton's sign: Facial flushing and congestion in case of retrosternal goiter if the patient raises his upper limb above his head.

Parotid swelling: it will elevate the lobule of the ear

- * Unilateral swelling due to bacterial parotitis or obstruction by stone.
- * Bilateral swelling as in: 1. Mumps. 2. Liver cirrhosis. 3. Sarcoidosis.

Upper limb Examination

✗ **Echymosis, purpuric rash:** in bleeding tendency (liver cell failure, thrombocytopenia)

✗ **Palmar erythema:** Liver cirrhosis, old age, rheumatoid arthritis, pregnancy.

✗ **Tremors:**

- Fine: Senile (elderly) & Thyrotoxicosis & Familial.
- Flapping: Organ failure (heart, liver, renal, respiratory failure).

✗ **Nails:**

- Koilonychia (Spoonng): Flat or concave nails with longitudinal striation in Iron deficiency
- Leukonychia: White nails in hypoproteinemia due to liver or renal disease.
- Half and half nail: Proximal half is white but distal half is brown (liver & renal failure).
- **Clubbing:** Proliferation of soft tissue at nail bed $\geq$ three fingers bilaterally.

Degrees of clubbing: Normal angle is $< 180^\circ$.

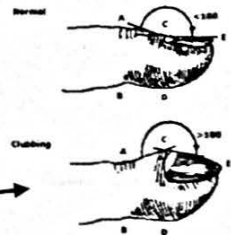
a) **1st degree:** Loss of the angle Tested by Window test

OR trans fluctuation test (earliest sign).

b) **2nd degree:** Parrot peak (the commonest)

c) **3rd degree:** Drum stick.

d) **4th degree:** Pulmonary osteoarthropathy: Painful swelling of ends of long bones as in the wrist, ankle and knee regions (Diagnosed by X ray).



• **Causes of clubbing(hypoxic or toxic):**

1. **Cardiac causes:** Congenital cyanotic heart, Infective endocarditis.
2. **Pulmonary:** Suppurative lung diseases, Bronchogenic carcinoma, methoselioma.
3. **Abdominal:**Ulcerative colitis & Crohn s disease, Familial intestinal polyposis
4. **Other causes:** Familial, Traumatic.

• **Causes of unilateral clubbing:** occupational or (Pancost tumor, Cervical rib)

Lower limb examination.

- 1- **Edema:** Press for one minute against bone on dorsum of the foot then behind the medial malleolus then shin of tibia. If it extends up to the knee: Pinch the skin on the thigh then the anterior abdominal wall. examine for sacral edema in bedridden patients.

Types:

1. **Pitting:** in hypoproteinemia (**hepatic and renal edema**) & cardiac edema and venous causes.
2. **Non-pitting edema** as in Myxedema & elephantiasis (preserved skin creases in lymphatic obstruction)

Causes of lower limb edema:

1. Unilateral (local cause): venous **obstruction** (DVT & varicose veins), lymphatic **obstruction** (lymphedema), **traumatic**, **inflammatory** (cellulitis), **neoplastic**.
 2. Bilateral (systemic cause): cardiac, renal, hepatic, malnutrition, allergic.
- **Generalized anasarca** means LL edema and pleural effusion and ascites
- Cardiac edema: bilateral, symmetrical, pitting, painless edema + congested tender Liver + congested NV, ascites develops after lower limb edema
 - Hepatic edema: bilateral, symmetrical, pitting, painless edema + shrunken Liver + splenomegally, ascites develops before lower limb edema
 - Cardiac cause of ascites precox (ascites before LL edema): Pericardial effusion, constrictive pericarditis, tricuspid valve disease (TR or TS).

2- Dorsalis pedis pulsations and Posterior tibial arter.

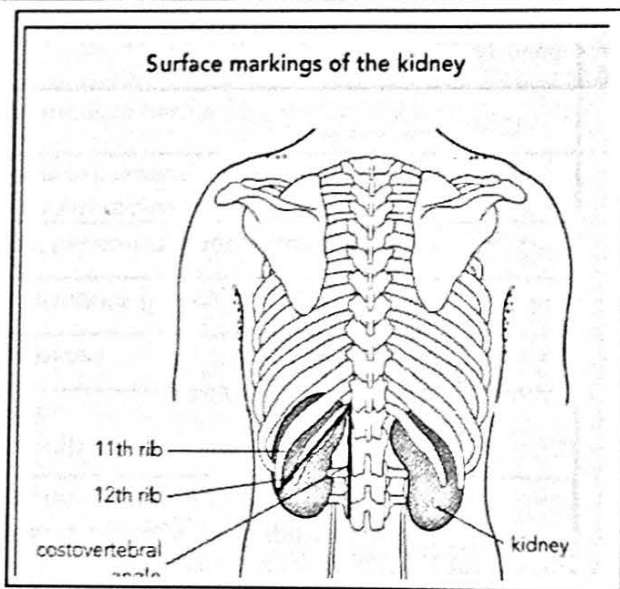
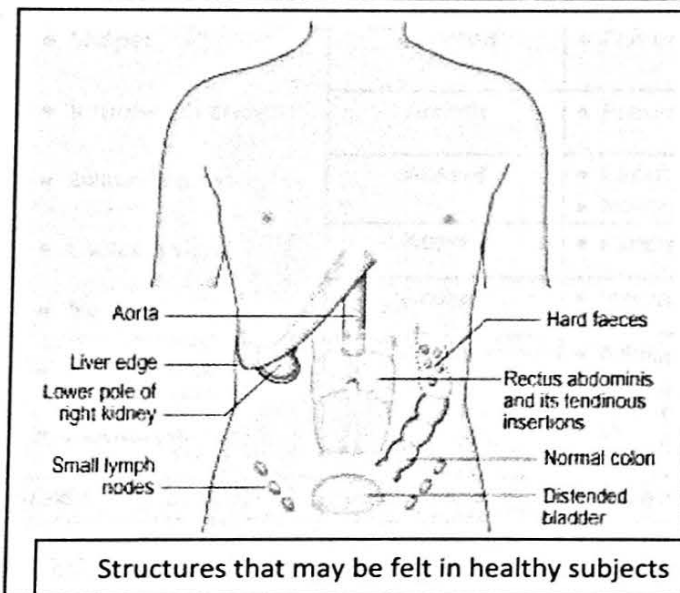
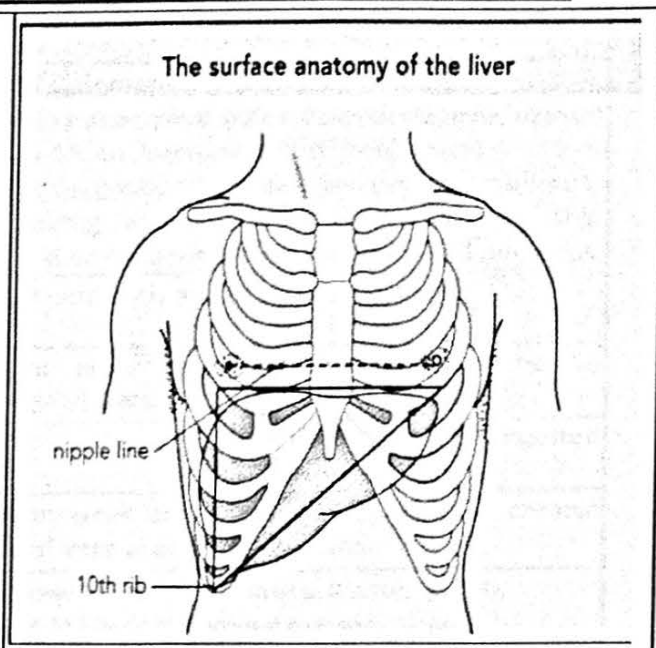
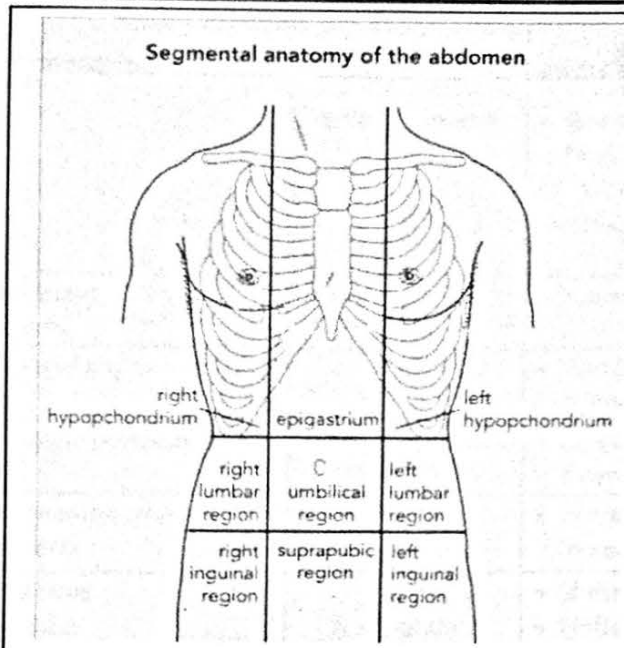
3- Deep venous thrombosis or lax calf muscles:

- Unilateral tense, tender and swollen calf ± pain elicited on dorsiflexion of the ankle.
- Tender calf muscles in:
 1. Deep venous thrombosis (DVT)
 2. Early diabetic neuropathy
 3. Guillain-Barre' syndrome

4- Ulcers: diabetic ulcer, varicose ulcer & ischaemic ulcer.

5- Hyperpigmentations: in HCV related liver cirrhosis & trauma.

Local abdominal examination, anatomical Background



Surface anatomy in local abdominal examination

- **Upper border of liver:** 5 space Lt.MCL, 5 space Rt.MCL, 7 space Rt.MAL, 9 space Rt SL.
- **Lower border of liver:** 5 space Lt.MCL, 10 rib Rt.MCL, 11rib Rt.MAL, 12 rib Rt SL
- **Gall bladder:** Point of intersection between rectus muscle and Rt.costal margin (9th costal cartilage)
- **Spleen:** 9th-, 10, 11th ribs in MAL medially & scapular line laterally, its long axis with 10 rib.
- **Traub's area:** 5 MCL, 8 costal cartilage, 9 MAL, 11 MAL.
- **Kidneys:** lower border T11 Vertebra, lower border L3 Vertebrae., 3 cm, 9 cm from vertebral line.
- **Loin:** the area from last rib to iliac crest and from vertebral column to flank.
- **Renal angle:** the angle between last rib and sacrospinalis muscle (costovertebral angle).

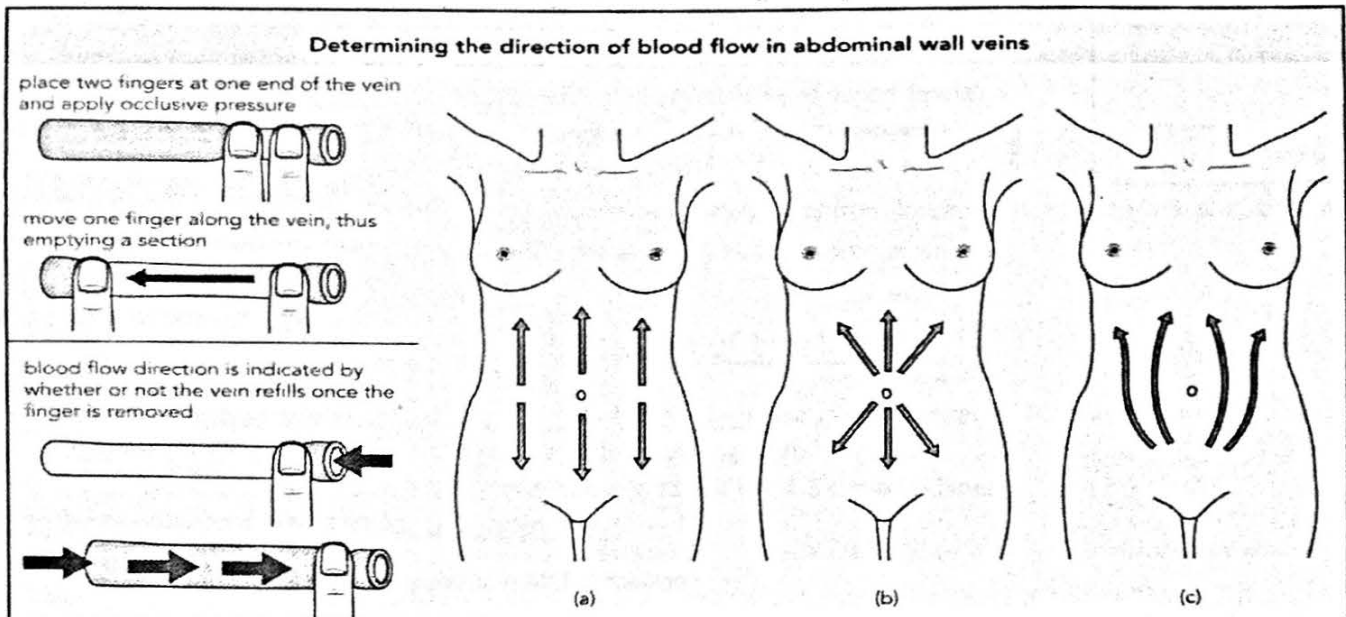
Inspection

	Normal	Abnormalities
1- Shape	slightly scaphoid with preserved waist	• Scaphoid abdomen in cachexia & malnutrition. • Generalized abdominal bulge: fluid (ascites, urine, ovarian) fat & fetus & flatus, faeces (Intes. Obstruction), fibroid • Obesity: thick subcutaneous fat and <u>sunken</u> umbilicus. • Ascites: bulging abdomen esp. in flanks with thin subcutaneous fat and flat or everted umbilicus.
2- Movement With respiration.	freely mobile with resp.	• Absent in peritonitis and tense ascites.
3- Subcostal angle.	<90°	• Wide in: upper abdominal swelling (hepatomegally, splenomegally) & emphysema & acromegaly.
4- Epigastric pulsations.	Absent or aortic puls. in thin subject	• Origin: aorta & Rt. ventricular enlargement & congested liver.
5- Diverication of recti. (rising test)	Absent	• Present in weak abdominal muscles due to chronic increase of intra-abdominal pressure.
6- Umbilicus:		
• Site:	Normal site.	• Shifted down in upper abdominal Masses (HSM). • Shifted up in lower abdominal masses.
• Shape:	Inverted	• Flat or Everted in ascites
• Impulse on cough:	Absent	• Present in umbilical hernia
• Dilated veins:	Absent	• Caput medusa in pulmonary Hypertension (periumbilical). • Inferior vena caval obstruction (lateral).
• Cullen's sign.	Absent	• Pancreatitis, peritoneal haemorrhage
• Nodules.	Absent	• Internal malignancy (pancreas, GIT, liver)
• Pigmentation.	Absent	• Addison's disease
• Discharge.	No or cotton discharge	• Ascitic fistula • Pus :severe inflammation
7- Pubic Hair (distribution)	Males: →  Females →  Inverted triangle.	• Male: Loss of pubic hair in liver cell failure (feminism) • Female: breast atrophy, irregular menses, amenorrhea.
8- Genitalia	Free.	• Testicular atrophy, Varicocele, hydrocele, ulcers, discharge.
9- Gynecomastia	Absent	• Present in liver failure, spironolactone
9- Scars & Stria & Scratch marks & Dilated veins, hemial orifices, visible perestalsis	Free.	• If present comment on eg, 20 cm mid-abdominal scar healed by 1ry intension with no impulse on cough.

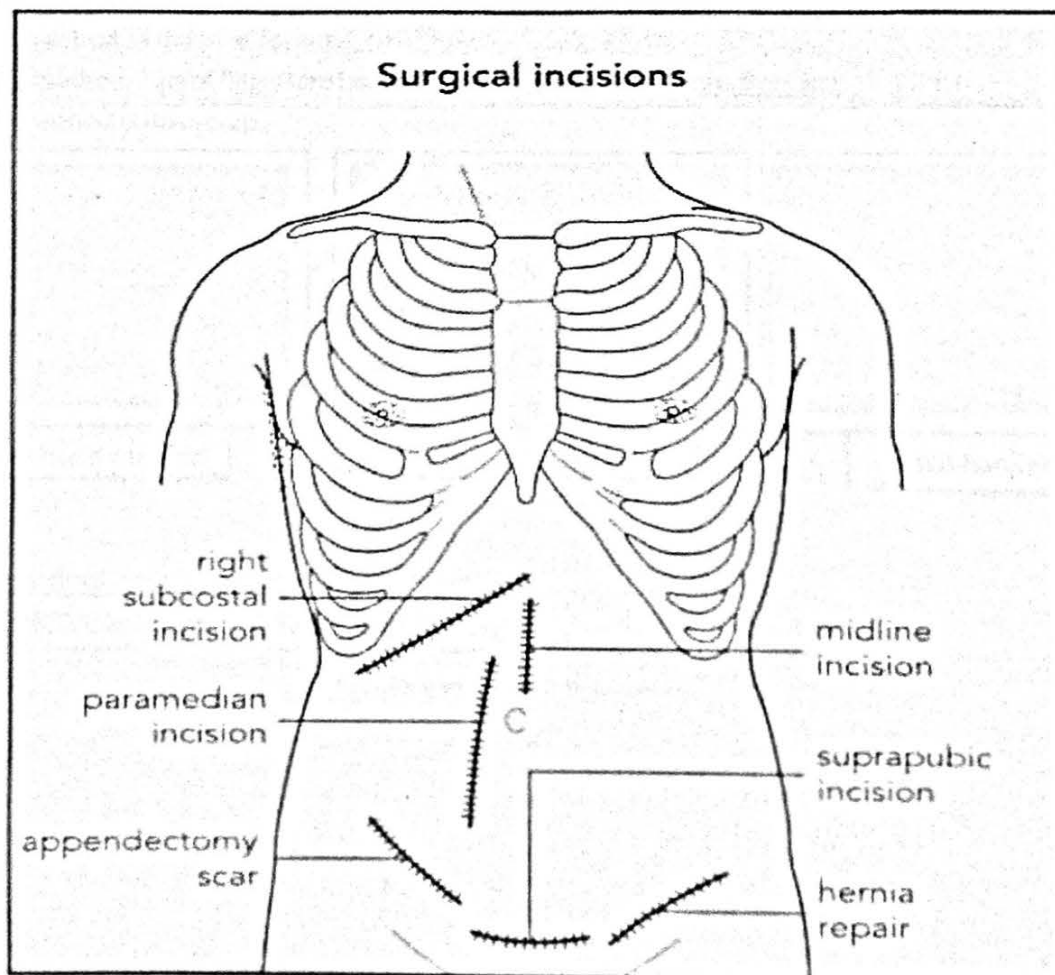
• Stria:

- ✓ Strech marks: after pregnancy (stria gravidarum) & after treatment of massive ascites
- ✓ Stria rubra: thinning of the skin and purplish discoloration (cushing syndrome).

- **Milking Test** : Differentiate between portal hypertension & inferior vena cava obstruction



Determining the direction of blood flow in abdominal veins. (a) Normal blood flow pattern and those characteristic of (b) portal hypertension and (c) obstruction of the inferior vena cava.



Surgical scars seen commonly on the abdomen.

Palpation

- ✓ Examine the abdomen with your warm hand.
- ✓ Relax abdominal muscles and scarps fascia (membranous layer of superf.fascia)
- ✓ Asking patient to flex his knees and to breath from his mouth during palpation.



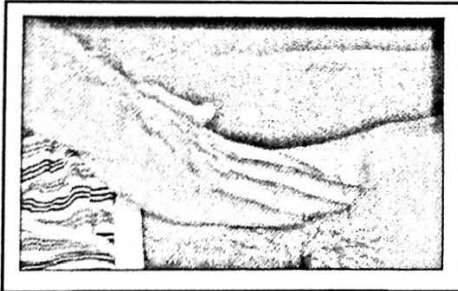
- 1) **Superficial palpation (keep your eyes on patient face):** Start away from tender part, Palpate in S- shaped way.
To detect rigidity, tenderness, superficial masses, to abolish nervous guarding.
- 2) **Deep palpation:** liver, spleen & kidney.

Palpation of the liver

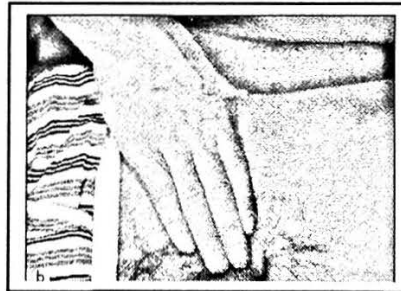
- **Method:** percuss the upper border of the liver first then Use radial border of Rt. hand in mid line and right MCL to feel the liver while the patient is breathing from his mouth.
- **Liver Span** is proportional to body size: 8-12 cm in Rt. MCL & 4-8 cm in midline.

Methods of palpation of lower border of liver:

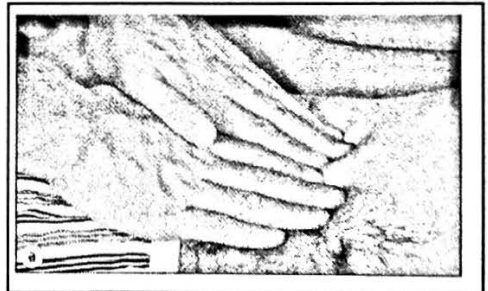
- 1- **Tips of fingers** from down upwards in MCL & midline.
- 2- **Radial border** of Rt. Hand (classic method): in Rt.MCL & in midline
- 3- **Two handed method.**
- 4- **Bimanual method:** if tender liver for detection of hepatic pulsations.
- 5- **Dipping method** in massive ascites.
- 6- **Hooking method:** Tips of fingers are hooked under costal margin if shrunk liver.
- 7- **Scratch method (Obsolete).**



Tips of hand method



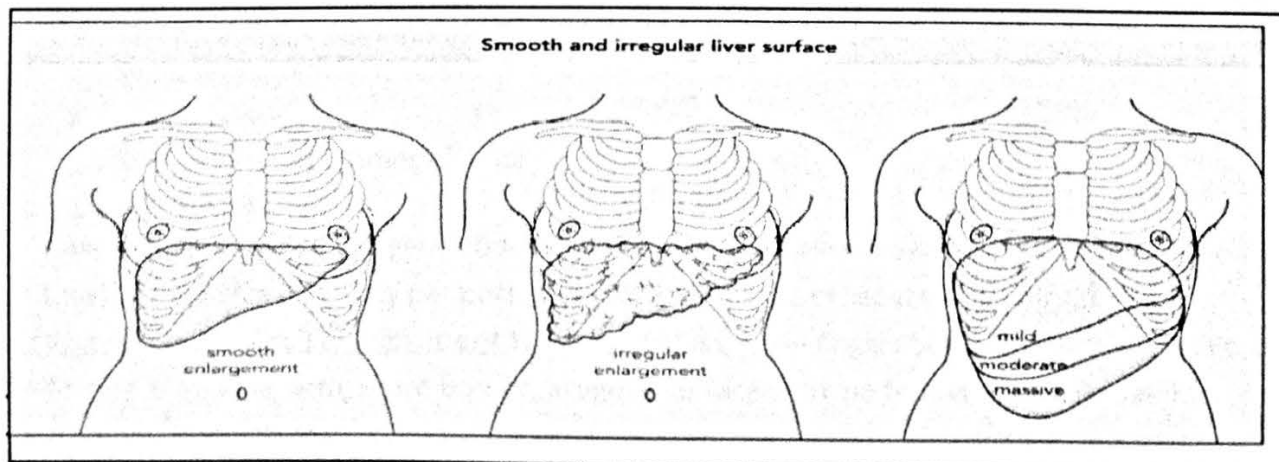
Radial border method



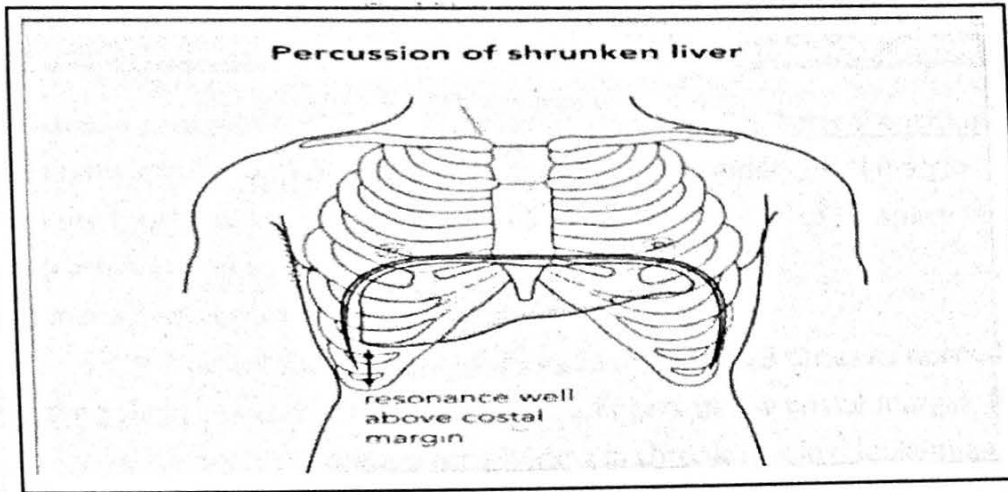
Two handed method

Concepts

- ✓ Palpable liver does not mean pathological liver:
- ✓ Different Patterns of palpable pathological liver:



- ✓ Shrunken liver is palpable only in midline and could be percussed at MCL



Abnormalities

1-Size: (by patient fingers):

- To detect the size of the palpable liver, you have to percuss the upper border.
- Shrunken liver is not palpable at MCL and palpable at midline.

2-Border:

- Rounded in normal & fatty liver.
- Sharp in cirrhosis & fibrosis.

3-Consistency:

- Soft: normal & fatty liver
- Firm: Cirrhosis.
- Hard: Malignancy.

4-Surface:

- Smooth: in normal & fatty liver.
- Irregular: Cirrhosis.
- Nodular: Malignancy.

5-Tenderness: (due to stretch of the Gilson's capsule)

1. Congestive hepatomegally due to right sided heart failure.
2. Hepatitis or liver abscess.
3. Hepatic Malignancy

6-Pulsations: denotes congestive hepatomegally due to right sided heart failure, TR, TS.

Causes of hepatomegaly:

1. Hepatitis (bacterial, viral, parasitic, drugs, auto immune).
2. Hepatocellular carcinoma.
3. Early cirrhosis.
4. Early fibrosis.
5. Congestive hepatomegally

Causes of shrunken liver:

1. Late Cirrhosis (Cirrhosis is degeneration → regeneration nodules → loss of hepatic architecture)
2. Late Bilharzial fibrosis (only periportal fibrosis without loss of hepatic architecture).

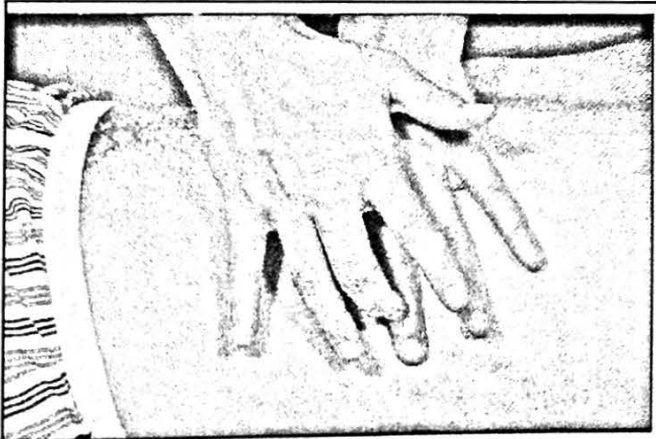
NB: If you felt the liver. The comment will be: Liver is felt --- fingers below costal margin in Rt. MCL and --- fingers in midline, firm, sharp border, irregular surface with no tenderness or pulsations.

Methods of palpation of spleen: with deep breathing:

1. **Tips of fingers** from right iliac fossa till left hypochondrium (**classic method**). Try to find the notch on its anterior border.
2. If not felt: do **bimanual** palpation with the patient on his right side (**Rt. Lateral position**).
3. If not felt: stand on his left side and do **hooking method**: palpate under costal margin
4. If not felt percuss the **traub's area** at the anterior axillary line at the level of 9th space in maximal inspiration (**castell's method** is the earliest sign of splenomegally)
5. **Dipping method** in massive ascites.

If you find the spleen, it is enlarged more than 3 times its normal size.

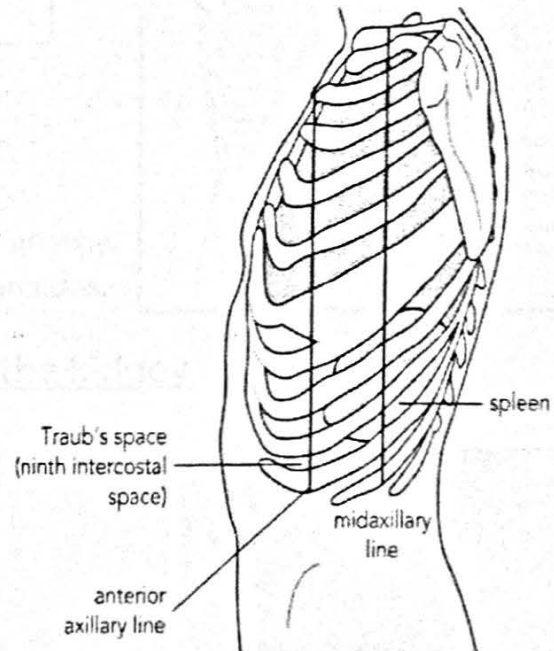
Then Comment on the spleen : spleen is enlarged & felt....fingers below costal margin, firm, smooth, not tender, not pitting (pitting in chronic myeloid leukemia= **Mofti's sign**)



After palpating for the spleen, percuss for the enlarged organ in the ninth intercostal space anterior to the anterior axillary line.

Percussion of Traub's Area

Localization of Traub's Area



Causes of dull traub's area:

- ✓ Splenomegally.
- ✓ Hepatomegally.
- ✓ Full stomach or gastric tumour)
- ✓ Ascites.
- ✓ Lt. Pleural effusion.

Causes of splenomegaly

- **Infective:** →

- ✓ Bacterial: Typhoid, brucellosis, abscess, infective endocarditis.
- ✓ Viral: EBV, CMV.
- ✓ Parasitic: Bilharziasis, Malaria, kala azar (black fever)

- **Hematological:** 3 blood + lymphoma
- **Congestive:** Portal hypertension (liver cirrhosis is the commonest)
- **Infiltrative:** lipid storage diseases.

Differences between Splenomegaly & left renal mass

Spleen	Kidney
There is a notch.	No notch.
Impossible to get above the spleen	You can get above the upper pole.
Traub's area is dull.	Resonant by percussion

Causes of tender splenomegaly:

- Splenic infarction from embolization as in atrial fibrillation.
- All causes of bacterial infections (see later)

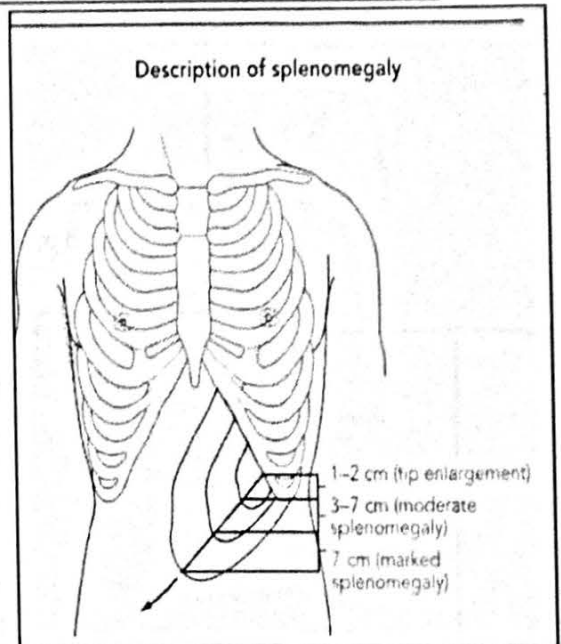
Causes of huge splenomegaly = cross midline or >7cm

- | | |
|--|--|
| <ul style="list-style-type: none"> • <u>3 Blood:</u> ✓ Thalassaemia major ✓ Myelofibrosis ✓ Chronic myeloid leukemia | <ul style="list-style-type: none"> • <u>3 Parasites:</u> ✓ Chronic Malaria, ✓ Bilharziasis, ✓ Kala -Azar |
|--|--|

- Lipid Storage diseases (Gucher's disease)

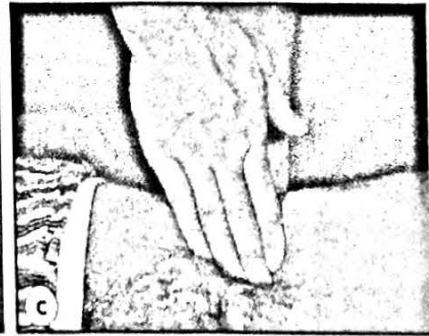
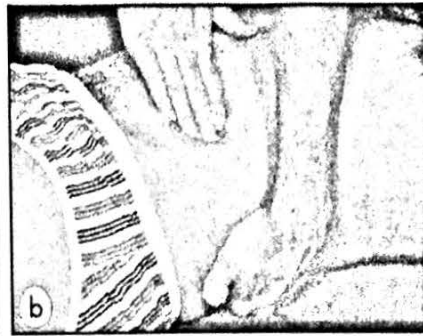
NB.Kala -Azar = visceral leishmaniasis (L.denovani).

- ✓ Causes of absent notch: congenital, congestion, malignancy.
- ✓ Causes of multiple notches: congenital, splenic infarctions.



Palpation of the kidney

- **Bimanual method:**



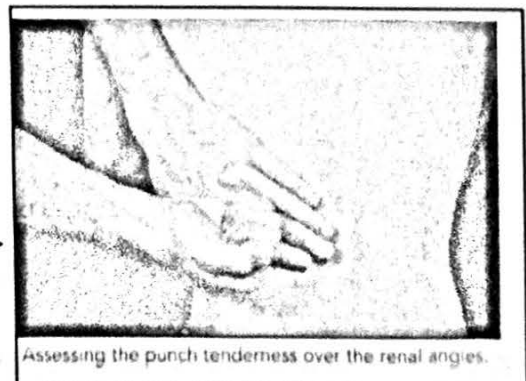
(a) When palpating the kidney, tuck the left hand behind the patient's back with your fingers positioned in the renal angle. Positioning the hands when palpating (b) the left and (c) the right kidney.

Causes of enlarged kidney :

- ✓ Polycystic kidney (bilateral)
- ✓ Renal tumors (unilateral)
- ✓ Hydronephrosis (bilat. or unilat.)

- The Punch Tenderness: to test tender renal angle

+ve in pyelonephritis & hydronephrosis.



Assessing the punch tenderness over the renal angles.

Percussion

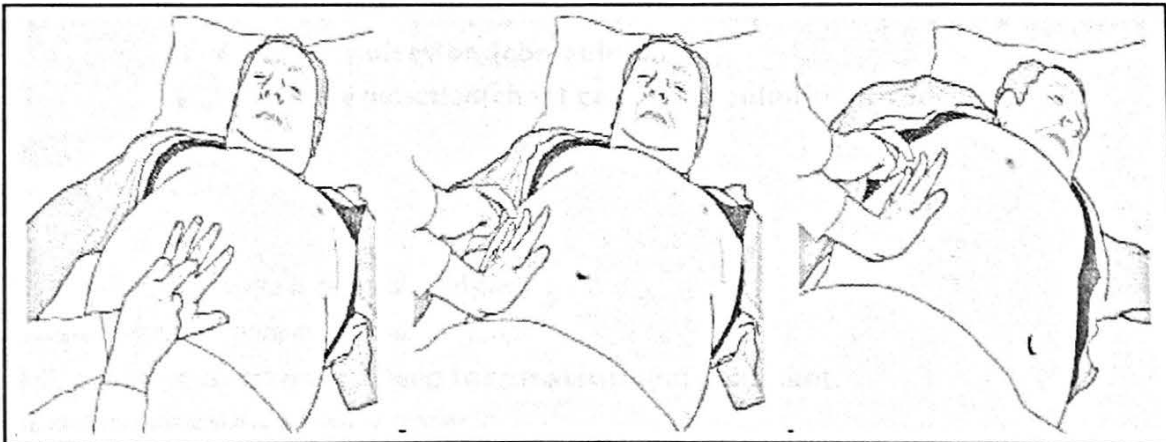
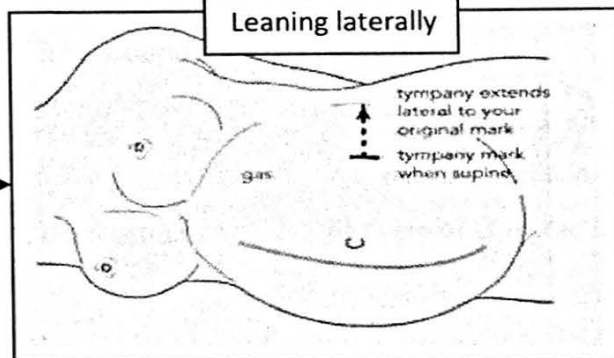
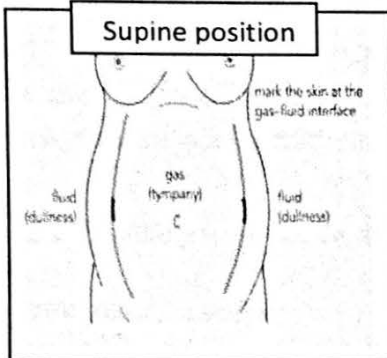
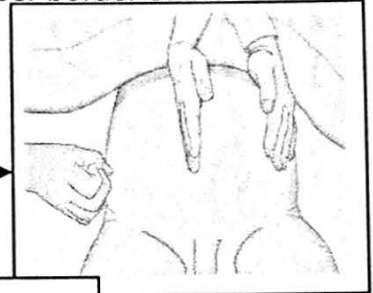
✗ **Rules of percussion:** (better coaptation, tip of finger on middle phalanx, parallel to the border of suspected dullness, from resonant to dull, do not damp the note).

1) Liver is percussed in the right MCL.

- Upper border by heavy percussion. Start from suprasternal notch to reach sternal angle, then find 2nd space from which you start percussion till you find dullness. then do tidal percussion with deep inspiration, the dullness will be resonant, now This is the upper border of liver.
- Lower border by light percussion.

2) Percussion for ascites.

- A- Shifting dullness (usually ascetic fluid > 1.5 liters)
- B- Transmitted thrill in tense ascites.
- C- Knee elbow position (obsolete): could detect 500 - 1.500 CC of ascitic fluid.
- D- Ultrasound can detected minimal amount of ascites (250 CC)



✗ Causes of ascites.

- Portal hypertension related (liver cirrhosis, heart failure, portal vein thrombosis.....)
- Non Portal hypertension related
 - 1) Peritoneal malignancy.
 - 2) TB peritonitis.
 - 3) Nephrotic syndrome

Auscultation

- 1- Intestinal sounds: 6-12 / min, Absent + abdominal distension in: paralytic ileus.
- 2- Bruit: Renal artery stenosis: a bruit may be present at anterior or posterior renal angle.
- 3- Venous hum: Portal hypertension: continuous murmur, between xiphisternum and Umbilicus)

Local Chest Examination

Inspection

Shape / skin / movement / pulsations:

Method: Stand at the foot of the bed with the patient centralized.

1-Shape: Normal shape is: Symmetrical & elliptical & Anteroposterior diameter < Transverse (ratio of 5:7).

A- Symmetrical abnormal shape.

- ✗ **Barrel shape:** COPD: symmetrical ↑ Anteroposterior diameter, Horizontal ribs, Wide subcostal angle.
- ✗ **Funnel chest (Pectus excavatum):** Depression of lower sternum as in shoe maker.

B-Asymmetrical abnormal shape:

1-Bulge:

Chest causes: Pleural Effusion, pneumothorax & hydropneumothorax
Other causes: Precordial bulge.

2-Retraction: collapse / fibrosis.

2- Skin:

- ✓ Dilated veins filling from above downwards: SVC obstruction.
- ✓ Scars.
- ✓ Gynecomastia.

3-Pulsation: As in cardiac case especially

- 1) **Apical pulsation** (impalpable in emphysema)
- 2) **Epigastric pulsation** (cor-pulmonale).
- 3) **Pulmonary pulsation** (chest causes of pulm. hypertension).

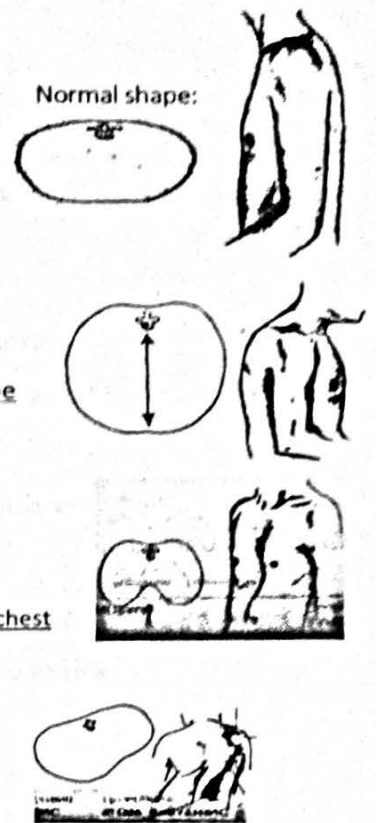
4-Movement:

- **Rate:** 16-20 /min.
- **Type:**
 - o Abdomino-thoracic type is normal in male
 - o Thoraco-abdominal type is normal in female.
- **Expansion:** Ask patient to take **very deep inspiration** and comment.
 - o Bilateral symmetrical expansion normally.
 - o Bilateral diminished expansion in bilateral diseases as COPD.
 - o Unilateral limited expansion in unilateral cause
- **Lower intercostals indrawing with inspiration** (litten's sign): Normal Slight indrawing. Exaggerated in obstructive airway diseases (exaggerated litten's sign) as COPD.

NB. Accessory muscles of respiration: active in obstructive airways as COPD.

- Trapezius & Sternomastoid, Scalenus (inspiratory).
- Latismus dorsi, abdominal muscles, diaphragm (expiratory).

NB. Abdominal paradox: Abdomen moves inwards with inspiration in diaphragmatic paralysis.



Palpation

Trachea/ Tenderness /TVF/ Chest Expansion /Pulsations / Rub / Rhonchi.

1) Trachea: Put the index finger between trachea and Sternomastoid on each side and compare both sides.

- ✓ Normal trachea is central.
- ✓ Deviated to **same side**: **pulled by** fibrosis & collapse.
- ✓ Deviated to **opposite side**: **pushed by** pleural effusion, pneumothorax.

NB.Trail's sign: Prominent Sternomastoid on side of tracheal shift with deep inspiration.

2) Tenderness: Palpate space by space and rib by rib.

- Causes: rib metastasis, myositis, osteochondritis, pleurisy, trauma, chronic cough.

3) TVF: Tactile Vocal Fremitus:

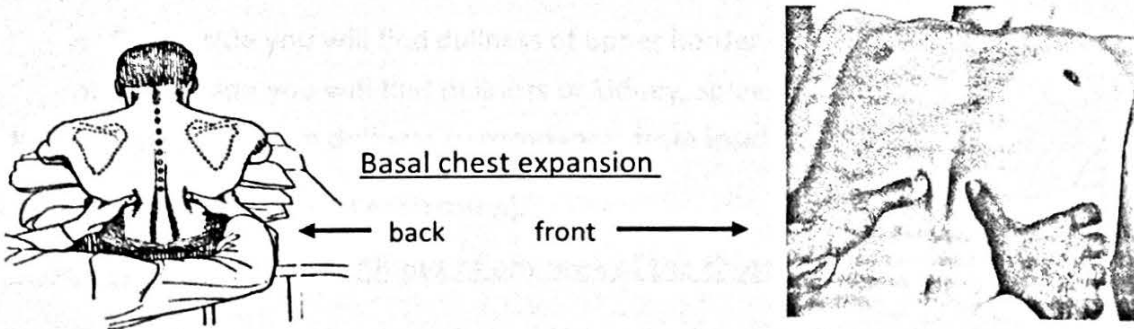
Method 3,1,3: Use the edge or the flat of your hand and compare while the patient is saying أربعة أربعة.

- Examine supra-mamary, mamary, infra-mamary parts of the front then the axilla.
- Normal TVF: equal on both sides:
 - ✓ **Bilateral ↓TVF** = diffuse disease as COPD.
 - ✓ **Unilateral ↓ TVF** = pleural effusion, pneumothorax, Collapse, fibrosis.
 - ✓ **Unilateral ↑TVF**= Consolidation (pneumonia), Cavity (TB cavity) & **dense fibrosis**.

4) Chest expansion(front 2 and back 2): Measuring tape or by your hands, Compare both sides.

Normally: good expansion (3-5 cm).

Abnormal expansion: confirm what is seen by inspection of movement (see before).



5) Pulsations: as cardiac exam.

6) Palpable rub (Friction Fremitus): may be present in pleurisy.

7) Palpable rhonchi (Rhoncus Fremitus): may be present in airway obstruction.

Surface anatomy in chest examination

- Lower border of the Lung: 6th rib in MCL/ 8th rib MAL /10th rib Scapular line.
- Lower border of the Pleura: 8th rib in MCL. / 10th rib MAL/ 12th rib Scapular line.
- Kronig's isthmus: From sternoclavicular joint to 7th Cervical spinous proces and From medial 2/3 of the clavicle to medial 1/3 of the spine of scapula.
- Oblique fissure: 3rd thoracic spine →5th rib in MAL → 6th costo-chondral junction.
- Transverse fissure: 5th rib in MAL→ 4th costo-chondra junction.

Percussion

✗ Percussion of the lung by light percussion except the back and Upper border of liver.

✗ Compare between sides.

✗ Notes of percussion:

- 1) Resonant :Normal lung.
- 2) Hyperresonant : emphysema, pneumothorax.
- 3) Dull:
 - Dull: collapse, consolidation.
 - Stony dull: pleural effusion.

1. Upper border of liver: Causes of Ptosed liver: Emphysema, left pneumothorax and visceroptosis.

2. Bare area

- Light percussion of the 3rd (for comparison), 4th & 5th spaces in left parasternal line.
- Normally the 4th and 5th spaces are Dull (the 3rd space is resonant (outside the bare area)).
- Causes of resonant bare area: emphysema & left sided pneumothorax

3. Percussion of the Lung by light percussion 6,3,6 & compare.

A) Mid clavicular line (MCL) 6:: percuss and compare space-by-space .

B) Midaxillary line (MAL) 3: With the patient elevating his upper limbs above his head



C) Back 6: Ask patient to hold his arms. Percuss suprascapular 1, Interscapular 2, then Subscapular area 3.

- On Rt. side **you will** find dullness of upper border of liver (9th. space).
- On Lt. Side **you will** find dullness of kidney, spleen (10th space)



4. Kronig's isthmus: from dullness to resonance: from inside to outside.

(Exception to the rules of percussion).

Causes of dull Kronig's isthmus or any area of the chest:

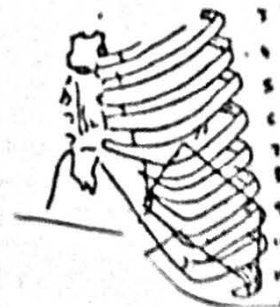
1. Apical TB.
2. Apical Fibrosis & collapse & pleural thickening.
3. Tumor (Pancoast).
4. Friedlander's pneumonia (consolidation).



5. Clavicles: Stretch the skin over clavicle and percuss directly. Normally, lavicles are equally resonant.

6. Traub's area: Percuss handbreadth above the left costal margin.

Normally it is tympanitic resonance.



5MCL, 8costocondral,
9MAL, 11 MAL

AUSCULATION^{3,1,3}

Auscultat all parts of lung fields and compare both sides.

I. Breath sounds:

- 1) **Vesicular breath sound** : heard on normal lung
 - Inspiration > expiration with **no gap**
- 2) **Vesicular with prolonged expiration**: expiration $\geq$ Inspiration with **no gap**
 - Causes: airway obstruction: Bronchial asthma, COPD.
- 3) **Diminished breath sound** :
 - Unilateral: Pleural effusion, pneumothorax, lung collapse,
 - Bilateral: severe bronchospasm.
- 4) **Bronchial breath sound** (normally on trachea): Inspiration = expiration with gap & **hollow**.

1. Consolidation (Pneumonia).	2. Cavity (TB, abscess)	3. Dense fibrosis.
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II. Adedd sounds: rhonchi / crepitations / rub.

1. **Wheezes(Rhonchi)** are continuous sounds due to airway obstruction = narrowing:

- **Timing:**
 - Expiratory: due to bronchospasm.
 - Inspiratory: due to secretion & disappears on coughing.
- **Types:**
 - Sibilant (obstruction of small airways)
 - Sonorous (obstruction of big airways)
 - Polyphonic: mixed Sibilant and Sonorous
- **Site and causes:**
 - Diffuse air way obstruction as COPD & bronchial asthma.
 - Localized obstruction as foreign body & secretion & tumor.

2. **Crepitations = rales = crackles (interrupted sounds):**

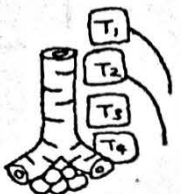
- **Types and causes:**
 1. Fine bilateral basal crepitations in left sided HF.
 2. Medium sized crepitations as in COPD & pneumonia.
 3. Coarse bubbling crepitations as in acute pulmonary edema.
- **Timing:** Inspiratory

3. **Pleural rub:** Friction sound & related to respiration & at the site of pleurisy.

III- Vocal resonance: Used for differentiation between Vesicular with prolonged expiration and

Bronchial breath sound.

- 1- Bronchophony: صوت الكلام (4-4) واضح بالسماعة
- 2- Whispering pectroliquy: صوت الهمس (4-4) واضح بالسماعة
- 3- Aegophony: nasal tone due to kinked bronchus at upper border of pleural effusion.



✗ **D'espine sign:** Whispering pectroliquy is heard below the fourth thoracic vertebra (body of T4) in cases of hilar lymphadenopathy.

Local Cardiac Examination

Combined Inspection and Palpation

- Ask patient to hold his breathing and look tangentially or stand at the foot of the bed.

1-Shape:

- Precordial bulge: denotes right ventricular enlargement (RVH) in early childhood.

2-Skin:

- Gynecomastia due to digitalis/ spironolactone/ cardiac cirrhosis.
- Dilated veins on chest in SVC obstruction.
- Scar of previous cardiac operation:
 - Median sternotomy scar of valve replacement or CABAG (coronary artery by pass graft).
 - Left inframammary scar for commissurotomy of mitral stenosis.

3-pulsations:

Normally only apical and epigastric pulsations (from aorta) are seen.

1- Apex; It is the lowermost, outermost & visible and palpable pulsations

	Normal	Abnormalities.
1. Site:	5 th . Space MCL.	1 - <u>Shifted out</u> in Right ventricle dilatation. 2- <u>Shifted out and down</u> in left ventricle dilatation
2. Extent:	localized to one space.	a. <u>Localized</u> = Left ventricle hypertrophy, b. <u>Diffuse</u> = Right ventricle hypertrophy
4. Character:	Brief Gentle tap.	• Forcible (strong): in LV enlargement A) <u>Forcible hyperdynamic:</u> In volume overload as AR, MR. B) <u>Forcible sustained</u> (Heaving) In Pressure overload as AS, hypertension.
5. Palpable sound:	Absent	Palpable accentuated S1 = MS
6. Palpable thrill:	Absent	- <u>Diastolic thrill</u> in MS: common. - <u>Systolic thrill</u> in MR: uncommon

- Thrill: it is a palpable murmur like the sensation of purring cat.
- **Slapping apex.** Palpable S1 in isolated MS.

Causes of impalpable apex:

-Obesity. -Behind a rib. -Pericardial effusion. -Dextrocardia. -Chest causes: Emphysema, effusion.

2- Base:

Search for	Aortic area	Pulmonary area
Palpable Systolic thrill (by the ball of the hand)	AS	PS (congenital)
Palpable pulsations (by the tips of fingers)	Aortic dilatation	<u>Pulm.hypertension.</u>
Palpable accentuated 2nd. Sound	Systemic Hypertension	<u>Pulm.hypertension</u> (diastolic shock)

NB. Thrill is usually systolic on the base (AS) & Diastolic on apex (MS).

NB. The best position to feel a thrill:

- Diastolic thrill on apex: Left lateral position.
- Systolic thrill on base: Patient sits, leaning forwards and exhales.

3- Left Parasternal pulsations: (Use the heel of your hand).

- RV Enlargement due to volume overload (TR) or pressure overload (pulm.hypertension).

4- Epigastric pulsations: your hand in epigastrium & patient holding his breath.

- 4- From Rt.ventricle.
- 5- From aorta.
- 6- From Enlarged, tender, pulsating liver.

N.B: Peripheral manifestations of AR.

- Collapsing Pulse (Water hammer): hyperdynamic circulation. - Capillary pulsations are seen upon gentle pressure on the nail tip - Corrigan's pulse: Visible vigorous carotid pulsations. - Carotid shudder: palpable carotid thrill	- De Musset sign: Head nodding. - Dorazie's sign. systolic and diastolic murmurs over the Femoral artery . - Pistol shot: sounds of opening of collapsed arteries heard on femoral artery. - Hill's phenomenon: SBP in lower limb is >Upper limb by more than 20 mmhg.
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Percussion (obsolete, obsolete, obsolete)

Signs of Rt. ventricle enlargement:

- Apex is diffuse, shifted outside.
- Left parasternal pulsations.
- epigastric pulsations from Rt ventricle.
- llower third sternal dullness.

Signs of Of Lt. ventricle enlargement:

- Apex: Localized, Shifted out and down.
- Forcible and sustained in pressure overload.
- Forcible and hyperdynamic in volume overload.

Auscultation

<u>Heart Sounds</u>	<u>S1</u>	<u>S2</u>
Cause = closure of	1) Mitral & tricuspid valves. 2) ventricular contraction	Aortic and pulmonary valves.
↑↑(accentuated)	- MS & TS - Tachycardia, Short PR interval.	Pulmonary hypertension systemic hypertension.
↓↓(muffled)	- MR, TR. - Bradycardia & Long PR interval.	Valvular stenosis (AS & PS)

Gallop: Abnormal three sounds (triple rhythm) heard on left or right ventricle. S1+ S2+ S3 or S1+ S2+ S4

Heart murmurs: Comment on any murmur:

- 1- **Timing:** Systolic murmur OR Diastolic murmur.
- 2- **Site of maximum intensity & main propagation.**
- 3- **Character:** Soft, Harsh, Rumbling.
- 4- **Relation to posture:**
 - a. Left sided murmurs increases in left lateral position.
 - b. Basal murmurs: increase with sitting, leaning forward & exhalation.
- 5- **Relation to inspiration:** Rt. Sided murmurs increase with deep inspiration.

Rules of Auscultation.

- Start with the cone on the apex then diaphragm for all areas.
- Comment on sounds (S1 on apex, S2 on pulm.area).
- Timing is done with carotid or apical systolic beat.

	Peripheral & Local signs	Murmur Character & Site of maximum intensity & main propagation.
MR	• Systolic thrill on apex.	Soft Pansystolic murmur on apex radiating to axilla.
MS	• Diastolic thrill on apex.	Mid diastolic rumbling murmur, with presystolic accentuation Localized to the apex, Increases on lateral position and Exercise.
TR	• Congested pulsating liver.	Pansystolic murmur on Tricuspid → apex and increases with inspiration
AS	• Thrill on 1st.aortic area	Harsh ejection systolic murmur on 1st.aortic area radiating to neck.
AR	• Peripheral Signs Of AR	Soft early diastolic murmur on 2nd.aortic area better if Sit & Lean forwards & Exhale.

Auscultation steps in order:

1. Mitral area (Lt 5th space MCL) : **MS**, if **MR** → axilla
2. Tricuspid area (4th space to the left of lower sternum): if **TR** → take full inspiration
3. Pulmonary (Lt 2nd space MCL) : **S2**.
4. 1st aortic(Rt 2nd space MCL) : if **AS** → root of the neck
5. 2nd Aortic area (left 3rd space): **AR**.

Artificial valves: There will be flow murmur across any artificial valve but never thrill.

- Artificial mitral valve will cause loud metallic first heart sound: audible and palpable.
- Artificial aortic valve will cause loud metallic second heart sound: audible and palpable

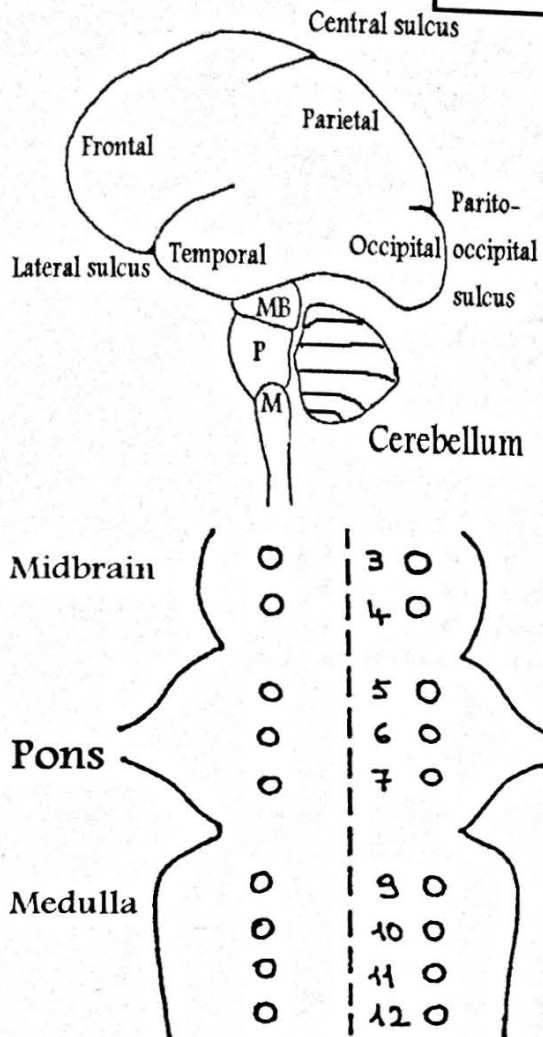
DD OF Systolic Murmurs

6. Ejection systolic murmurs: AS, PS, Coarctation of aorta (heard on interscapular area).
7. Pansystolic murmurs: MR, TR, VSD (left 3rd, 4th spaces).

DD OF Diastolic murmurs.

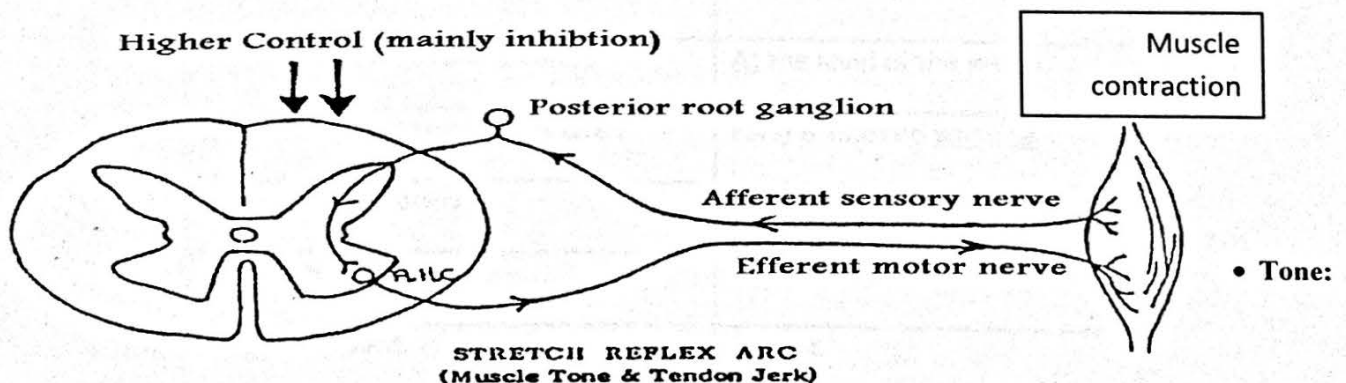
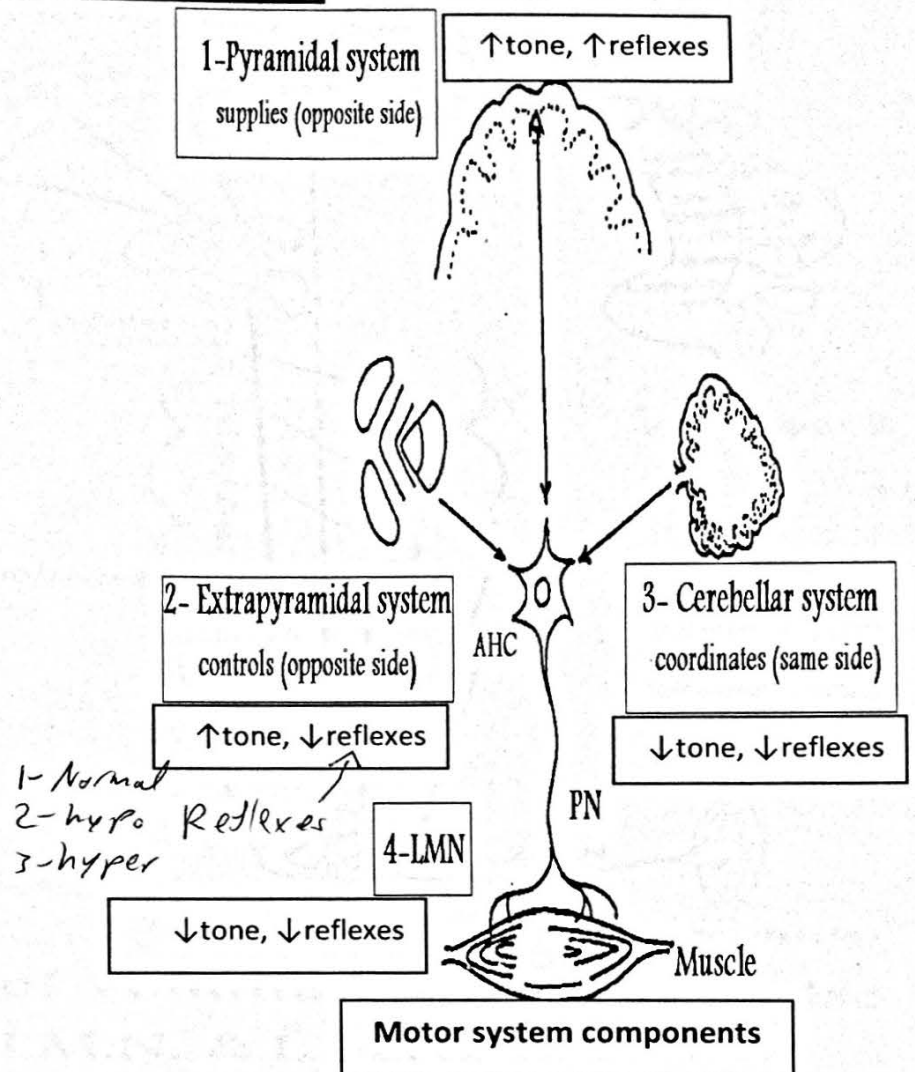
1. Aortic regurg
2. Pulmonary regurg (Graham steel murmur).
3. Organic MS
4. Austin flint murmur: functional MS.
5. Careycomb murmur: functional MS

Basics of neurology



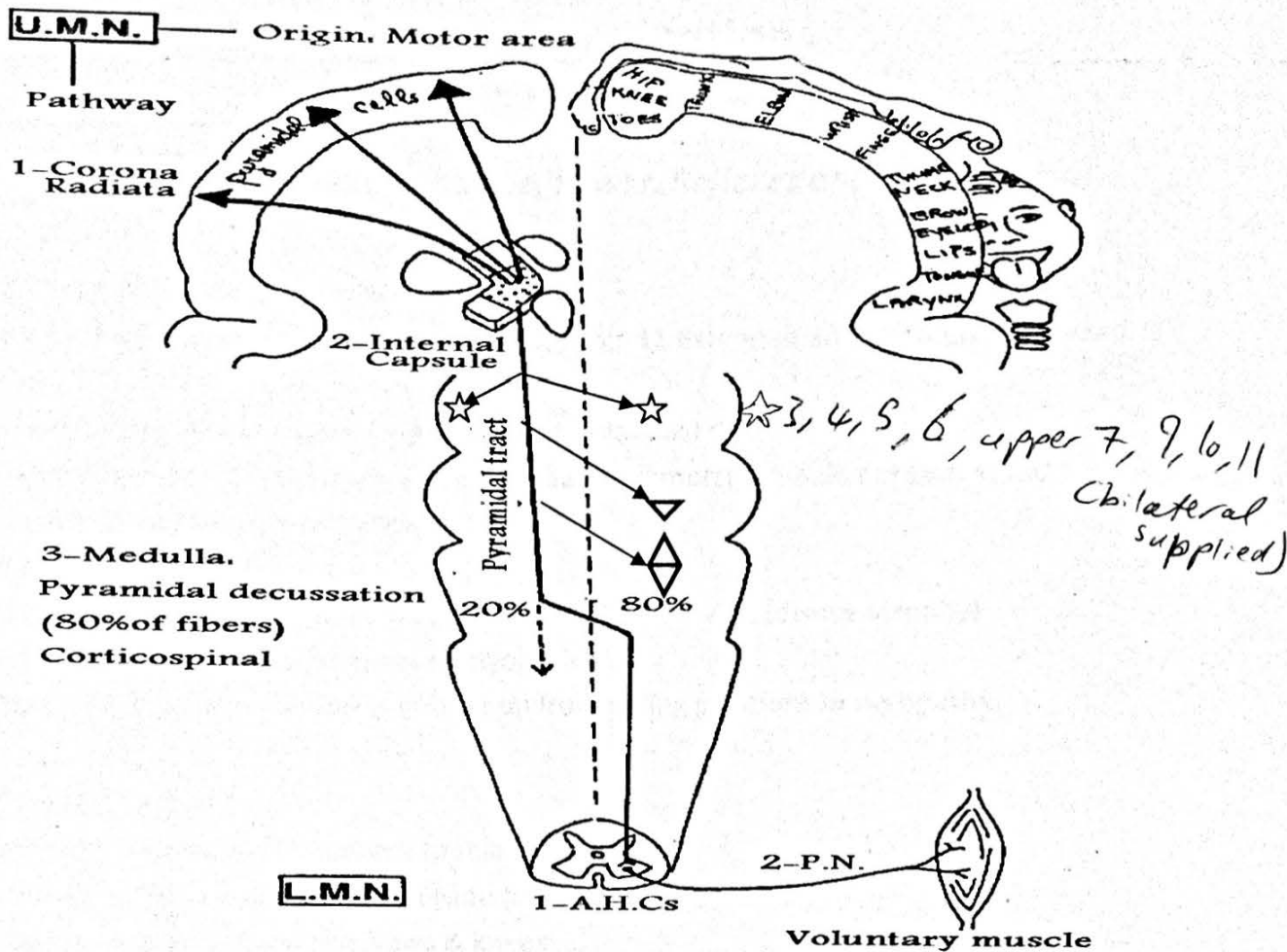
Midbrain	3	4
Pons	5	6
Medulla	7	8
	9	10
	11	12

Cranial Nerves Motor Nuclei



Tone Spontaneous continuous stretch reflex for maintaining body posture & muscle nourishment).

- **Reflex:** induced local stretch reflex.
- **Pathological reflexes:** normally absent present in UMN lesion.
- **Clonus:** repetitive rhythmic contractions on sudden sustained stretch of muscle, +ve in UMN



Pathway of Voluntary Motor Impulse U.M.N. & L.M.N.

	UMNL	LMNL
Paralysis	<u>Below</u> the level of the lesion.	<u>At</u> the level of the lesion.
State of muscles	<u>No</u> wasting & if present it is late .	Early & marked <u>wasting</u> .
Muscle tone	Hypertonia (Spasticity).	Hypotonia (Flaccidity).
Deep reflexes	Hyperreflexia.	Hyporeflexia .
Pathological reflexes e	May be present.	Absent.
Clonus	May be present.	Absent.
Planter reflex	<u>Positive</u> i.e. dorsiflexion of big toe ± fanning of toes (Babinski sign).	Planter flexion of toes or no response. <i>Cequi Vocal</i>)

Local Neurological Examinations

❖ **Motor system** (*Inspection, Tone, Power, Reflexes and coordination*)

1- **Inspection:** Expose limbs and compare both sides.

1. **Posture:** in hemiplegia (**ul:** flexed, adducted & wrist drop- **LL:** Extended, adducted, planter flexed & inverted)
2. **Skeletal deformities:** and pes cavus (indicating herido-familial disease)
3. **Abnormal Movement:** Fasciculation, Intension kinetic tremors (cerebellar ataxia), static tremors (extra pyramidal lesions (parkinsonism))
4. **State of muscle bulk:**
 - Wasting: Severe and early in LMNL, Distal and late in UMNL (disuse atrophy)
 - Pseudo-hypertrophy: in some types of myopathy.
5. **Gower test:** Characteristic manner in getting up from sitting position: **in myopathy.**

2- **Examination of the tone**

- Compare both limbs, order the patient to relax.
- Shaking for wrist (up and down) & ankle (side to side)
- Passive flexion and extension for Elbows & knees
- Rolling or circumduction for Hips.
- Gower method: shaking the shoulders in the sitting position from his axillae.

	<u>Hypotonia</u>	<u>Hypermyotonia</u>
Causes	1. Shock stage of upper motor neuron lesion (UMNL) 2. Lower motor neuron lesion (LMNL) 3. Cerebellar lesion.	1. Spasticity: (pyramidal lesion): clasp - knife. 2. Rigidity: (extra pyramidal lesion as Parkinsonism): lead pipe (rigid) or cogwheel (interrupted by tremors) 3. Others: meningeal irritation, hysterical.

	Spasticity	Rigidity
Cause	Pyramidal	Extra pyramidal: parkinsonism.
Distribution	Distal > proximal Antigravity > progravity.	Proximal > Distal Flexors (of all body)
Character	Clasp-knife	Lead pipe (rigidity all through)
Reflexes	Hyperreflexia	Hyporeflexia

3- Examination of the power

- ✓ Ask patient to do Voluntary active movement.
- ✓ Power is tested against resistance if there is movement against gravity
- ✓ You have to fix the joint above.
- ✓ Compare both sides (healthy limb is the normal control).

Pyramidal weakness:

- ✗ Progravity (UL extensors and LL Flexors) are weaker than antigavity (UL Flexors and LL extensors)
- ✗ Abductors are weaker than Adductors.
- ✗ Ankle: dorsiflexion and eversion are weaker than planter flexion and inversion.

Grades of power:

Grade 0	No visible contraction.	Grade 1	Visible contraction with no movement
Grade 2	Movement with eliminating the gravity	Grade 3	Movement against gravity.
Grade 4	Movement against resistance	Grade 5	Normal power

Shoulder:

- ✓ Adduction: Pectoralis major & minor.
- ✓ Abduction: Supraspinatus: 0-15°, Deltoid: 15-90°, Trapezius: 90-180°.
- ✓ Flexion: Anterior fibers of deltoid.
- ✓ Extension: Posterior fibers of deltoid

Elbow:

- ✓ Extension: Triceps/
- ✓ Biceps: flexes the elbow with the hand supinated
- ✓ Brachioradialis (supinator): flexes the elbow with the hand semipronated

Wrist: Test extension and flexion with the fist closed.

Hand:

- ✓ Test handgrip: ask the patient to squeeze your index and middle fingers.
- ✓ Radial nerve supplies extensors of wrist & fingers.
- ✓ Median nerve supplies thumb opposition (oppon.policis) and abduction(abd.policis previs).
- ✓ Ulnar nerve supplies: thumb adduction, intereossi (palmer inteross=adduction, dorsal inteross = abduction), and lumbricals (writing position).

Hip:

- ✓ Flexion: iliopsoas.
- ✓ Extension: Gluteus maximum:
- ✓ Abduction: Gluteus medius & minimus
- ✓ Adduction Adductors: longus, brevis & magnus

Knee: Extension: Quadriceps, Flexion: Hamstrings.

Ankle:

- ✓ Dorsiflexion: Anterior tibial group
- ✓ Plantar flexion: Calf muscles
- ✓ Inversion: Tibialis anterior & posterior
- ✓ Eversion: Peroneal muscles

4- Examination of the reflexes 0, 1, 2, 3, 4

Deep Reflexes

- Expose the muscle. Put the limb in a position for a maximum response.
- Observe for movement of the joint, Compare both sides.

Reflex	Root	Position	Response
1) Biceps	(C5-6)	120°	Contraction + flexion of elbow.
2) Brachio-radials	(C5-6)	120° with the hand midway between supination and pronation.	Contraction + flexion of elbow and fingers.
3) Triceps	(C6-C7)	90°	Contraction + extension of
4) Knee	(L2-3-4)	Heel touches bed Or sits at the edge of the bed.	Contraction + extension of knee.
5) Ankle	(S1-2)	Knee flexed 90° & ankle flexed 90°.	Contraction + plantar flexion

Hypo-reflexia	Hyporeflexia or Lost reflexes
1. Shock stage of upper motor neuron lesion (UMNL). 2. Lower motor neuron lesion (LMNL). 3. Cerebellar lesion.	1. Upper motor neuron lesion (UMNL). 2. Tetanus. 3. Nervous tension. 4. Thyrotoxicosis.

Pathological reflexes	Clonus
• Jaw jerk (5 th CN): bilateral pyramidal lesion above pons. • Supraspinatus (C2-3). • Finger flexion (C8-T1). • Patellar reflex (L2, 3, 4). • Adductor reflex (L4).	1. Wrist clonus. 2. Patellar clonus. 3. Ankle clonus.

Superficial Reflexes

1. Plantar reflex (S1) by Babinski method:

- Normal response: plantar flexion of big toe & flexion and adduction of other toes.

No response (equivocal)	Babinski sign: {Plantar extensor response with fanning of other toes}.	Other methods:
1. S1 lesion, paralysis of foot muscles. 2. Thick or cold skin. 3. Shock stage of pyramidal lesion.	1. Pyramidal tract lesion. 2. Coma, deep sleep & under anesthesia. 3. Infant 6-18 months. 4. Drug intoxication (barbiturate).	▪ Oppenheim's: firm pressure over the shin of tibia ▪ Gordon's: Squeeze calf muscles. ▪ Schaefer's: Squeeze tendo-Achilles.

2. Superficial abdominal reflexes (T6 - T12):

- Stimulate upper and then lower abdomen from outside to inside with a sharp object.
- Lost in:
 - Pyramidal lesions.
 - LMNL affecting T6-T12.
 - Obese/multipara/ ascitic patients.

3. Other Superficial abdominal reflexes:

- Cremasteric: Scratch inner thigh → Retraction of ipsilateral testicle.
- Anal reflex: scratch the skin around anus → external sphincter contraction.

0: Reflex absent

1: Hyporeflexia

2: Normal

3: hyper reflex

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4: clonus



Coordination

: Tested if no motor weakness

• Buttoning and unbuttoning.(earliest sign)	
• Finger to finger → past pointing → decomposition (intention tremors). • Finger to nose. • Finger to doctor's finger.	• Rebound phenomenon: flex elbow against resistance. • Negative Rombergism: no exaggeration of ataxia on eye closure. • Heel to knee test.



Gait

Abnormal gait.	Lesion
Circumduction gait	Unilateral pyramidal lesion.
High steppage gait.	Peripheral Neuritis.
Shuffling gait: festinate gait.	Parkinsonism.
Wide base, Drunken gait, Deviation to one side.	Cerebellar lesion.
Stamping gait	Deep sensory loss.



Sensory system

(Superficial, Deep sensation & Cortical sensations)

Superficial sensation: It is tested with closed eyes.

A) Pain: Use sharp needle; compare face to upper limb, lower limb and compare both sides.

- *Hemianesthesia:* Diminished sensation on one half of the body including the face.
- *Peripheral neuritis:* Diminished sensation on foot and or hands compared to the face.
- *Sensory level:* Affects both lower limbs in extra medullary focal spastic paraplegia
- *Radicular sensory loss.*

B) Temperature: Use hot and cold water in test tubes.

C) Crude Touch: It is tested by cotton wool (do not move).

Deep sensation

- Joint sense:** (position & movement sense): Teach the patient first then he closes his eyes
- Nerve sense:** firm pressure over ulnar nerve at the elbow.
- Muscle sense:** Squeeze calf muscles.
- Vibration sense:** Use tuning fork (128 HZ) on the medial malleolus

Deep sensory loss:

- **Sensory ataxia** corrected by vision: +ve Rombergism.
- **Abnormal finger to nose test** corrected by vision: +ve Rombergism.

Cortical sensations(with closed eyes & no superficial or deep sensory loss).

- Stereognosis:** Patient can recognize a familiar object like a key.
- Graphothesia:** Patient can recognize a familiar figure drawn on his palm.
- Tactile localization:** Patient can recognize the site of pain induced by a needle prick.
- Tactile discrimination.** Patient can recognize 2 needle pricks separated by an adequate distance (narrow distance in finger tips, wide distance in the back).

❖ Cranial nerves examination

- ✗ Cranial nerve nuclei are supplied by both pyramidal tracts **except**: 12th nucleus and lower half of 7th motor nucleus are supplied by opposite pyramidal tract only.

- ✗ 1st CN: Olfactory nerve, 2nd optic nerve, 8th vestibulocochlear, 9th glossopharyngeal, 10th vagus.

3rd CN (P, P, M, N)=(no ptosis, pupil is RRR, normal movement, no nystagmus)

- | | |
|--|---|
| 1. Supplies all extraocular muscles except Lateral rectus & Superior Oblique 'SO4' | 1. <u>External Ophthalmoplegia</u> : Ptosis & Divergent squint (eye looks down + out) |
| 2. Supplies intraocular muscles: constrictor pupillae & ciliary muscles. | 2. No diplopia due to ptosis. |
| | 3. <u>Internal Ophthalmoplegia</u> : Dilated fixed pupils. |

4th CN Trochlear (superior oblique = SO4)

Test: Ask patient to look to his nose: down and in.

Lesion: squint on looking to nose, falldown on walking down stairs.

6th CN Abducent (lateral rectus).

Test: Ask patient to look to ipsilateral ear

Lesion: Cannot look to his ears with Convergent squint.

5th Trigeminal:

Sensory:

- Sensation of the face: Compare pain sense on both sides.
- General sensation: anterior 2/3 of tongue.

Reflexes:

- **Corneal and conjunctival reflex**(5 aff, 7 eff)

Test: With a piece of cotton touch cornea or conjunctiva, blinking of both eyes will occur

- **Palatal reflex:** see bulbar reflexes.(5 aff, 10 eff)

Motor: Muscles of mastication

- **Pterygoids:** Test: mouth opening against resistance.
- **Masseter:** feel the muscle while patient is clenching his teeth
- **Temporalis:** feel the muscle while the patient is clenching his teeth.
- **Jaw reflex** (5 aff, 5 eff).

LMN Lesion:

- ✓ Jaw deviated to abnormal side.
 - ✓ Loss of sensation on the same side of the face sparing the angle of the mandible.
 - ✓ Loss of general sensation over anterior 2/3 of tongue.
 - ✓ Ipsilateral loss of corneal, conjunctival & Palatal reflex
- Bilateral UMN** → exaggerated jaw jerk.

7th CN: Facial nerve:

Motor: Facial muscles:

Sensory: Taste to anterior 2/3 of tongue.

Use sugar, salt, lemon.

Autonomic: Lacrimation & salivation.

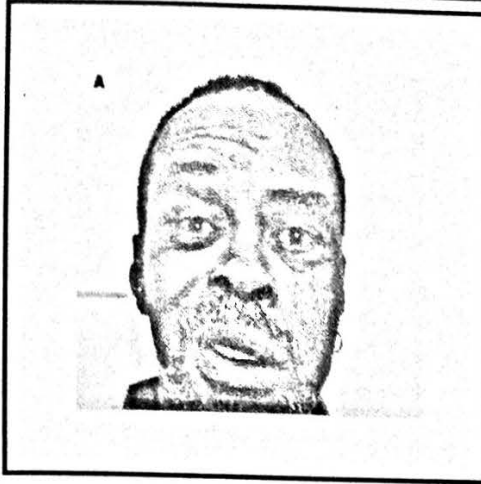
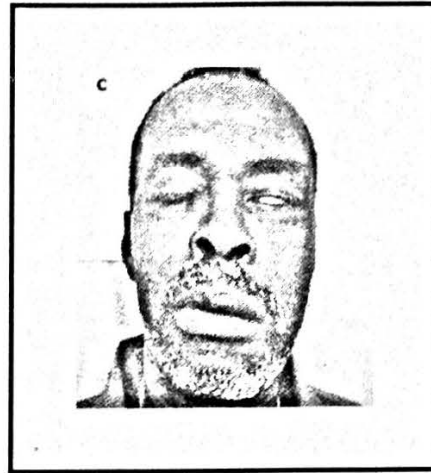
Reflex: glabella reflex.

LMNL: Ipsilateral facial paralysis affecting upper & lower face.
Inspection:

1. Lost wrinkles, Bell's eye (opened eye).
2. Obliterated nasolabial fold.
3. Angle deviation to opposite side ± dripping of saliva.

Test: raise your eye brow, your eyes, expose your teeth, blow your cheek 1st without resistance 2nd against resistance.

UMNL: Contralateral facial paralysis affecting lower half of the face (obliterated nasolabial fold, angle deviation, teeth exposure, blowing the cheek).

**TEST**

12th CN: Hypoglossal *Inspect inside mouth, then outside, then test*

Motor: Tongue muscles

Test:

- Inspect the Tongue inside the mouth then protruded.
- Tongue power against side of the cheek.
- Tongue power against resistance

Lesion:

- Fasciculations: Motor neuron disease.
- Scrotal tongue (wasted) in LMNL.
- Deviation of tongue to hemiplegic side and weakness of its power.
- Inability to maintain protrusion: chorea

speech

Dysarthria: It is articulation defect without language defect due to lesion in muscles of articulation. Supplied by 5,7,10,12 CN under pyramidal, extra pyramidal and cerebellar control

1. **Slurred speech:** Bilateral pyramidal lesion with pseudo bulbar palsy: Hesitant, explosive, strangulated dysarthria يأكل الكلام
2. **Monotonous speech:** Parkinsonism.
3. **Staccato speech:** Cerebellar dysarthria مقطع

Aphasia : it is an expression defect.

1. Motor aphasia:

- a. **Verbal aphasia: (Broca's area 44):** patient can't express himself in spoken words.
- b. **Agraphia: (Exner's area 45):** patient can't express himself in written words.

2. Sensory aphasia:

- a. **Visual agnosia (area 18):** can not understand what he sees
- b. **Auditory agnosia (area 22):** can not understand what he hears